

REMARKS

Upon entry of the present Amendment-F, claims 1-16 are pending in the application, of which claims 1-3, and 7 are independent. Claims 1-3, 7, 10, and 11-14 have been amended by the present amendment. Claims 6, 8 and 9 have been withdrawn for consideration by the Examiner in connection with a previously imposed Restriction Requirement.

The above-identified Office Action has been reviewed, the references carefully considered, and the Examiner's comments carefully weighed. In view thereof, the present Amendment-F is submitted.

It is contended that by the present Amendment-F, all bases of objections and rejections set forth in the Office Action have been traversed and overcome. Accordingly, reconsideration and withdrawal of the objections and rejections is respectfully requested.

Amendments Presented

In the Claims: Independent claims 1-3 and 7 have been amended in an effort to address / overcome the Examiner's new rejections of claims under 35 USC 101 and 112, second paragraph. Specifically, each of the independent claims now expressly defines that "the object is contained within the image captured by the camera unit" for thereby directly overcoming the rejection under 35 USC 112, second paragraph. Further, method claims 1, 2 now define a step of capturing an image containing an object using a camera unit with a lens / lens system; claim 1 defines the step of compensating a position of the object contained in the captured image

according to the calculated discrepancy; claim 2 defines calibration information for the camera unit, and the position of the object detected in step (b) is compensated according to said discrepancy; claim 7 is amended similarly to claim 2; dependent claims 10, 11 define that the calibration information is for the camera unit; claim 14 is amended to properly indicate that it is directed to an apparatus, rather than a method; claims 12-13 further define that the camera unit is adapted to be positioned on one of an automobile and a movable robot, and the method includes the further step of outputting the compensated / calculated position of the object to the automobile or the movable robot; and claim 14 is amended to indicate that the apparatus outputs the calculated position.

New claims 15, 16 further define that the method of claims 1, 2 includes a further step of outputting the compensated position of the object as an actual position of the object.

Applicant respectfully submits that the above amendments are fully supported throughout the original disclosure, including the specification, claims and drawings. Applicant also respectfully submits that no new matter is introduced into the application by the above amendments because all of the subject matter thereof was expressly or inherently disclosed in the original application.

Claim Rejection --35 USC §112, Second Paragraph

Claims 1-5, 7 and 10-14 stand rejected under 35 USC 112, second paragraph, as being indefinite. It is now the Examiner's position that the claims are indefinite – they fail to

particularly point out and distinctly claim the invention- since they do not clearly specify where the object exists. Also, the Examiner identifies two possibilities / interpretations of where the object may exist, i.e., the object itself does not lie strictly within the image, thus physically compensating the image; or the object itself does lie within the image, thus compensating the image is a matter of changing its position within the image, and asserts that he applies the second interpretation for the rejections under 35 USC 103.

Applicant's Response

Upon careful consideration and in light of the above amendments to the claims, applicant respectfully submits that the rejection is overcome and that persons skilled in the art would clearly understand from the claim language, interpreted in light of the specification disclosure, that the object exists within the image. This is the only situation discussed in the specification, and now expressly defined in each of the claims. Accordingly, it is respectfully requested that the rejection be reconsidered and withdrawn.

Claim Rejections --35 USC §101

Claims 1, 2 and 10-13 stand rejected under 35 USC 101 as being directed to non-statutory subject matter. It is the Examiner's position that the process claimed is not statutory (not an article or material). More specifically, it is the Examiner's position that the rejected claims solely embody an abstract idea, natural phenomenon, or law of nature, and do not qualify as a practical application of an judicial exception under 35 USC 101 because the claims fail to either :

transform an article or physical object to a different state or thing (physical transformation); or produce a useful, concrete and tangible result.

The Examiner further asserts that: the image data (of a pixel) as claimed is merely a block of existing information such as a number, an information value or signal, rather than something physical or tangible; that the claims fail to indicate a physical transformation, nor a useful, concrete and tangible result because the claims fail to define further information as to indicate physical location (e.g., memory, display) for a complete transformation of an image signal; and the method steps defined in the rejected claims are non-statutory because they: are not tied to another statutory category (e.g., a particular apparatus); or fail to transform underlying subject matter (e.g., article or material).

Applicant's Response

Upon careful consideration and in light of the above amendments, applicant respectfully submits that the rejection is overcome and that the present method claims are directed to proper statutory subject matter under 35 USC 101, because the method defines in each of the rejected claims is tied to another statutory category, i.e., a camera unit with a lens / lens system; and because they do transform an underlying article / subject matter, i.e., images of objects as captured by the camera unit are modified / transformed by being provided with fundamental compensation for the distortion of the images due to the lens / lens system of the camera unit, so that the positions of the objects can be accurately determined despite the intrinsic, non-linear

distortion inherent in the images captured by such a camera unit .

Moreover, the rejected claims include limitations falling within 35 USC, 112, sixth paragraph, and hence should be interpreted as encompassing the corresponding steps of the embodiments of the invention as disclosed in the specification and “equivalents” thereof. Each of the disclosed embodiments is clearly tied to specific apparatus (e.g., a pair of cameras with a lens / lens system which dynamically capture images of objects, a camera with a lens system which dynamically capture images of objects and a floodlight which projects a collimated beam of light on the objects, etc.), and each of the embodiments fundamentally compensates images captured by the camera(s) for the distortion of the images due to the camera unit including the lens / lens system such that a position of an object in an image captured by the camera unit may be accurately determined and outputted.

As explained in the original specification, accurate information on the position of an object within an image captured by a camera unit with a lens / lens system as is generated according to the claimed method may be advantageously used by an automobile, a movable robot and the like for controlling the movements of such devices.

The above amendments to claims 1, 2 further establish that the claims are directed to proper statutory subject matter, e.g., the claims specifically involve an image captured by a camera unit with a lens/ lens system, it is the position of an object within the captured image which is compensated / calculated, etc.

In view of the foregoing, it is respectfully requested that the rejection under 35 USC 101 be reconsidered and withdrawn.

Claim Rejections --35 USC §103

1. Claims 1-3, 5, 7, 10, and 12-14 stand rejected under 35 USC 103(a) as being unpatentable over Genco et al. (US Statutory Invention Registration H000315) in view of Spence (US Patent 3,782,822). It is the Examiner's position that: Genco's method of measuring optical properties of a transparency (such as a helmet visor) includes all the claimed features except for compensating the position of the object according to the discrepancy; Spence's disclosed method / apparatus for automatic ranging with variable power telescopic gun sight shows that it is well known to provide for the compensation of the object according to a discrepancy based on a distance between an object and an optical center (item 21) and to compensate the position of the object according to the discrepancy; and that it would have been obvious for the method of Genco et al. to include a compensation feature as disclosed by Spence to achieve an object recited by Spence.

Applicant's Response

Upon careful consideration and in light of the above amendments, applicant respectfully submits that the rejection is overcome and that present claims 1-3, 5, 7, 10, and 12-14 patentably distinguish over the applied references, based on the following.

Initially, applicant respectfully submits that the applied references fail to make obvious the claimed invention because the apparatus disclosed by each of Genco and Spence has nothing

to do with providing fundamental compensation for the distortion of *an image captured by a camera unit including a lens / lens system* so that the position of an object within the image may be accurately determined, or with determining a discrepancy of light (a light beam) penetrating the lens system relative to an optical center of the lens system. Given such fundamental deficiencies of each of the reference disclosures relative to the claimed invention, any hypothetical combination of the references *based on the actual teachings thereof* would fail to achieve or make obvious the claimed invention. Thus, for example, neither reference disclose or suggests steps of *capturing an image containing an object using a camera unit with a lens system, calculating a discrepancy of an incident beam of light penetrating the lens system of the camera unit relative to an optical center of the lens system, and compensating a position of the object contained in the captured image according to the calculated discrepancy* as required by claim 1, or similar method steps as defined by claim 2, or similar process steps as defined by claim 7.

Also, neither reference disclose or suggests *an image input means for incorporating the image captured by the camera unit; a pixel position detection means for detecting a position of a pixel representative of the object in the image incorporated by the image input means; a storage means for storing calibration information which correlates the position of the pixel with both a direction of an incident beam of light originating from the object and a displacement from a reference point to the incident beam; and a position calculation means* as required by claim 3.

Applicant also respectfully submits that both of the applied references are non-analogous art to the claimed invention, such that persons of ordinary skill in the art would not have looked to either of these references even if such persons were considering hypothetical modifications to a camera unit containing a lens / lens system which captures images having objects therein.

Clearly, neither reference discloses or pertains to a camera unit and hence are not in the same field of endeavor as the claimed invention. Further, neither reference reasonably pertains to the problem which is addressed (and overcome) by the claimed invention, i.e., the previous impossibility of fundamentally compensating for intrinsic, non-linear distortion of the camera unit lens system without knowing the actual distance to an object within an image captured by the camera unit.

Applicant also respectfully submits that persons of ordinary skill in the art would not consider the Examiner's proposed modification to Genco's method of measuring optical properties of a transparency based on a select feature of Spence's disclosed method / apparatus for automatic ranging with variable power telescopic gun sight to be obvious because the references do not provide any motivation for the proposed modification, and the Examiner has not identified any other appropriate motivation for the proposed modification under 35 USC 103. The two references are directed to different fields of art, e.g., determining the optical property of a transparency such as a helmet visor has nothing to do with automatic ranging for a variable power telescopic gun sight, etc.; Genco's method has *nothing to do with compensation*, but only

with determining an optical property of a fixed, non-variable medium; etc.

Based on the foregoing, applicant respectfully submits that the rejection based on Genco and Spence is overcome, and it is respectfully requested that the rejection be reconsidered and withdrawn.

4. Claim 4 stands rejected under 35 USC 103 as being unpatentable over Genco et al in view of Spencer and Day et al. With respect to claim 4, the Office Action states that: the combination of Genco and Spence does not teach at least two cameras or storage means storing calibration information for each camera; Day et al.'s system for automatically determining the position and attitude of an object includes at least two cameras and a storage means storing calibration information for the cameras; and that it would have been obvious to persons skilled in the art at the time of the invention to further modify the proposed combination of Genco and Spence with the discussed features of Day for the purposes of these features as discussed by Day.

Applicant's Response

Upon careful consideration and in light of the above amendments, applicant respectfully submits that the rejection is overcome and that present claim 4 is patentably distinct over the applied references because Day fails to overcome the basic deficiencies of Genco and Spence as discussed above, e.g., Day's system for automatically determining the position and attitude of an object also has nothing to do with providing fundamental compensation for the distortion of an image of an object captured by a camera unit with a lens system. Hence any hypothetical

combination of the applied references based on the actual teachings thereof would fail to achieve or make obvious the claimed invention.

Additionally, persons of ordinary skill in the art would not consider the Examiner's proposed further modification to the hypothetical combination of Genco's and Spence's relative to select features of Day pertaining to use of multiple cameras and a storage means to be obvious because the references do not provide any motivation for the proposed modification, and the Examiner has not identified any other appropriate motivation for the proposed modification under 35 USC 103. Although Day's system uses three cameras to determine the position of an object (e.g., a vehicle body on an assembly line), Day is directed to a completely different field of art as compared to the other references. There is no apparent reason why (or how) the multiple cameras and storage means of Day's system would be desirable in Genco's method of *measuring optical properties of a transparency such as a helmet visor* or in Spence's system for automatic ranging with variable power telescopic gun sight (singular) as disclosed by Spence. While the features of Day perform desirable functions in his disclosed system, these features are simply not required by the methods / systems of Genco and Spence.

For all the foregoing reasons, applicant respectfully requests reconsideration and withdrawal of the Examiner's rejection of claim 4 under 35 USC §103(a).

Other Matters

New claims 15, 16 are believed to be allowable for those reasons discussed above

regarding claims 1, 2, and for the merits of the additional features recited in these new claims.

Conclusion

Based on all of the foregoing, applicant respectfully submits that all of the objections and rejections set forth in the Office Action are overcome, and that as presently amended, all of the pending claims are believed to be allowable over all of the references of record, whether considered singly or in combination.

Applicant requests reconsideration and withdrawal of the rejection of record, and allowance of the pending claims.

If the Examiner is not fully convinced of the patentability of all of the claims now in the application, applicant respectfully requests that the Examiner contact applicant's undersigned representative to expeditiously resolve any issues remaining in the prosecution of the application.

Favorable reconsideration is respectfully requested.

Respectfully submitted,



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